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ARTICLE VI.

THE SKULL AND TEETH OF ECTOPHYLLA ALBA.

(Plate XVI.)

BY HARRISON ALLEN, M.D.

Read before the American Philosophical Society, January 21, 1898.

In 1892 (*Proc. U. S. Nat. Mus.*, 1892, No. 913, 441), I described a bat from Honduras under the name of *Ectophylla alba*. The single specimen was without skull. I have been permitted through the courtesy of Mr. Oldfield Thomas, of the British Museum, to inspect a second example of the genus. The material consisted of a dried skin and a skull of a male individual which was mutilated by shot in the pterygoid and orbital regions. The specimen was collected at San Emilio, Lake Nic-Nac, Nicaragua.*

The *norma verticalis* shows faint fronto-temporal lines which barely approximate near the bregma, but recede from that point posteriorly so that no trace of a temporal crest exists. The fronto-maxillary inflation is conspicuous and makes a swollen border for the upper and anterior orbital margins. The nasal bones are sharply elevated above the plane of the maxilla. Sufficient of the *norma basilaris* remains intact to show that the hard palate is elongated and the palatal bones are produced, thus separating the genus sharply from *Stenoderma* and its allies and allying it to *Vampyrops* (see Synoptical Key). The basioccipital bone is deeply pitted for muscular impressions. In this respect it presents a marked contrast with *Vampyrops*, in which this bone is nearly flat. The tympanic bone is small, leaving the greater part of the cochlea exposed. The *norma occipitalis* shows a weak occipital ridge. The junction of the ectopetrosal † surface of the pars-petrosa with the occipital bone is complete, while in *Vampyrops* a vacuity exists.

The lower jaw retains a curved aciculate angle relatively twice the size of the same

* The skin was badly mutilated by shot and the nose leaf and chin plates so distorted that no attempt is made to compare the parts with the original description. The second interdigital space is without pigment, head and neck both above and below are pure white. The lower third of the body both on dorsum and ventre is tipped with ash-gray.

† I propose naming that part of the pars-petrosa lying in the brain case the endopetrosal, and that lying exposed back of the pars-squamosa the ectopetrosal part (*Journ. Acad. Nat. Sci.*, 1896, Philadelphia).

part in *Vampyrops*. The masseteric muscle extends to the lower margin of the ascending ramus. The coronoid process is one-third smaller than in the genus last named.

Dental formula: i. $\frac{2}{2}$ — c. $\frac{1}{1}$ — prm. $\frac{2}{2}$ — m. $\frac{2}{2} \times 2 = 28$.

The Teeth.—Upper incisors conical; the centrals larger than the laterals with relatively broader bases. The centrals are separated from each other by a smaller interval than exists between these teeth and the laterals, or between the teeth last named and the canines. The canines are slender and slightly longer than the second premolar. The first premolar is pointed, root much exposed and is about one-third the size of the second. The first upper molar is quadrate with trenchant marginal cusps in position of protocone, paracone and metacone; the crown defined by these elements is concave. The second molar is pyriform, the base being toward the palate. A pointed marginal cusp is seen in the position of the paracone and a second in that of the metacone. The crown is concave and simple, save for a longitudinal ridge. The premolars and molars are separate from one another; the greatest interval being between the premolars.

The lower incisors are blunt cones, contiguous, filling space between canines; the teeth last named are deeply excavate posteriorly. Premolars are aciculate, the first tooth almost touching the canine and is smaller than second. The second tooth is deeply concave posteriorly with a conspicuous heel and cusp. The molars are subequal, without W-pattern. The first molar is obscurely quadrate, slightly narrowed in front with enormous sharply pointed paraconid; other cusps are absent; the lingual border is not raised. The second molar is subrounded, no trace of cusps being present other than a longitudinal ridge in the middle of the deeply excavate crown. The front and lingual borders of the tooth are greatly elevated, the former furnished with two sharp processes, the latter crenulate. The teeth are all separated from one another beyond the canine, the smallest interval being that between the canine and the first premolar and the widest between the premolars.

Ectophylla is in alliance with *Vampyrops*. It resembles this genus in the upper incisors and first upper premolar being conical and in the prolongation of the palatal bones. The shape of the lower first molar possesses a large paraconid, but is without protoconid. In the dental characters last named *Ectophylla* is like all other *Stenoderminæ*, excepting *Brachyphylla*, *Artibeus*, *Dermanura* and *Sturnira*.

The forms exhibiting the stunted, first, lower molar are again divided into two groups by the palate and the lower jaw. In *Chiroderma*, *Vampyrops* and *Ectophylla* the palate is oblong; the palate bone extends to a point answering to the anterior root of the zygoma, or even the posterior third of the arch, and the lower jaw has a well-defined posterior border to the ascending ramus, with no deflected angle. In *Pygoderma*, *Stenoderma* and

Trichocorys, the palate is rounded, as a rule excavated and rarely reaches a point answering to the anterior root of the zygoma; the lower jaw has no well-defined posterior border, the boldly deflected angle almost reaching the condyloid process.

The position of *Ectophylla* in the Stenoderminæ is shown in the synoptical natural key. *Brachyphylla* is an annectant genus to the Glossophagina through *Phyllonycteris*. *Artibeus*, *Dermanura* and *Sturnira* apparently relate to the Vampyri, but while the structure of the molars is essentially that of this group, no annectant form is known. *Sturnira* in the simplicity of the tooth structure recalls *Hemiderma*. The relation between the remaining genera of the table is intimate. The Stenoderminæ constitute, with the exception of the Heamatophillia, the most aberrant group of the Phyllostomididæ.

I recognize, therefore, the following natural arrangement of the genera :

Subfamily STENODERMATINÆ.

Brachyphyllini.....	<i>Brachyphylla</i> .
Artibeini.....	{ <i>Artibeus</i> . <i>Uroderma</i> . <i>Dermanura</i> . <i>Sturnira</i> .
Chirodermini *.....	{ <i>Chiroderma</i> . <i>Vampyrops</i> . <i>Ectophylla</i> .
Stenodermini.....	{ <i>Stenoderma</i> . <i>Pygoderma</i> . <i>Centurio</i> . <i>Trichocorys</i> . <i>Ametrida</i> . <i>Sphæronycteris</i> .

A Natural Synoptical Key of the Stenodermidæ, Based on Characters Derived from the Skull and Teeth.

I. First lower molar elongate with paraconid distinct.

Group Brachyphyllini....	{ a. Angle of lower jaw broad, scarcely pointed, concave above, not deflected, ascending ramus defined. Hard palate oblong, palatal bones produced. Upper incisors conical, molars $\frac{3}{4}$; crowns coarsely ridged; all cusps of the first lower molar subequal... <i>Brachyphylla</i> .
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* *Chiroderma* is not as near *Vampyrops* and *Ectophylla* as the members of other groups are to each other.

- Group Artibeïni.....
- a'. Angle of lower jaw narrow, aciculate, not deflected ; posterior border of ascending ramus defined ; hard palate oblong ; palate produced.
 - b. Palatal bones extend to point answering to the middle of zygoma. Upper incisors flat ; first upper premolar broadly lanceolate ; crowns of molars rugose ; protoconid and paraconid of first lower molar prominent, subequal, the others rudimental.
 - c. Molars $\frac{2}{3}$*Artibeus*.
 - c'. Molars $\frac{2}{3}$*Dermanura*.
 - b'. Palatal bones extend to point answering to the anterior third of the zygoma. Upper incisors conical, contiguous ; first premolar narrow lanceolate ; crowns of molars smooth ; all cusps of first lower molar subequal, anterior commissure cuspidate ; molars $\frac{3}{4}$*Sturnira*.

II. First lower molar subquadrate without paraconid.

- Group Vampyropini.....
- d. Hard palate oblong, palatal bones produced. Upper incisors conical.
 - e. Angle of lower jaw quadrate, not deflected, posterior border defined. Nasal bones absent in adult ; palate bones produced nearly to the line of glenoid cavity. First upper premolar acicular ; first lower molar with protoconid and mesaconid subequal. Molars $\frac{2}{3}$...*Chiroderma*.
 - e'. Angle of lower jaw acuminate, not deflected. Protoconid of first lower molar aciculate, enormous.
 - f. Hypoconid first lower molar rudimental ; molars $\frac{2}{3}$...*Vampyrops*.
 - f'. Hypoconid first lower molar none ; molars $\frac{2}{3}$*Ectophylla*.
 - d'. Hard palate round, palatal bones scarcely, if at all,* produced.
 - e''. Angle of lower jaw rounded, deflected, posterior border ascending ramus not defined.
 - g. Frontal bone in orbit greatly inflated ; palatal bones extend to a point answering to the anterior root of the zygoma ; pterygoids produced, inflated and nearly touching the panicle bones ; upper incisors conical ; protoconid of first lower molar scarcely larger than other cusps ; hypoconid of the same tooth marginal, rudimental molars $\frac{2}{3}$...*Pygoderma*.
 - g'. Frontal bone in orbit not inflated ; palate bone produced to anterior third of zygoma ; upper incisors conical ; protoconid first lower molar enormous ; hypoconid of same tooth marginal ; molars $\frac{2}{3}$*Ametrida*.
 - g''. Frontal bone in orbit scarcely inflated ; hard palate with posterior margin excised ; pterygoids not produced. Upper incisors flat ; protoconid of first lower molar enormous.
 - h. Palate excised to first molar ; hypoconid of first lower molar inside contour. Molars $\frac{2}{3}$*Stenoderma*.
 - h'. Palate excised to middle of first molar ; hypoconid of first lower molar marginal. Molars $\frac{2}{3}$...*Trichocorys*.
- Group Stenodermini.....

* Mr. O. Thomas (*Ann. and Mag. Nat. Hist.*, 1889, p. 70) first employed this character to separate this group from the foregoing.

Measurements of Ectophylla alba (in millimeters).

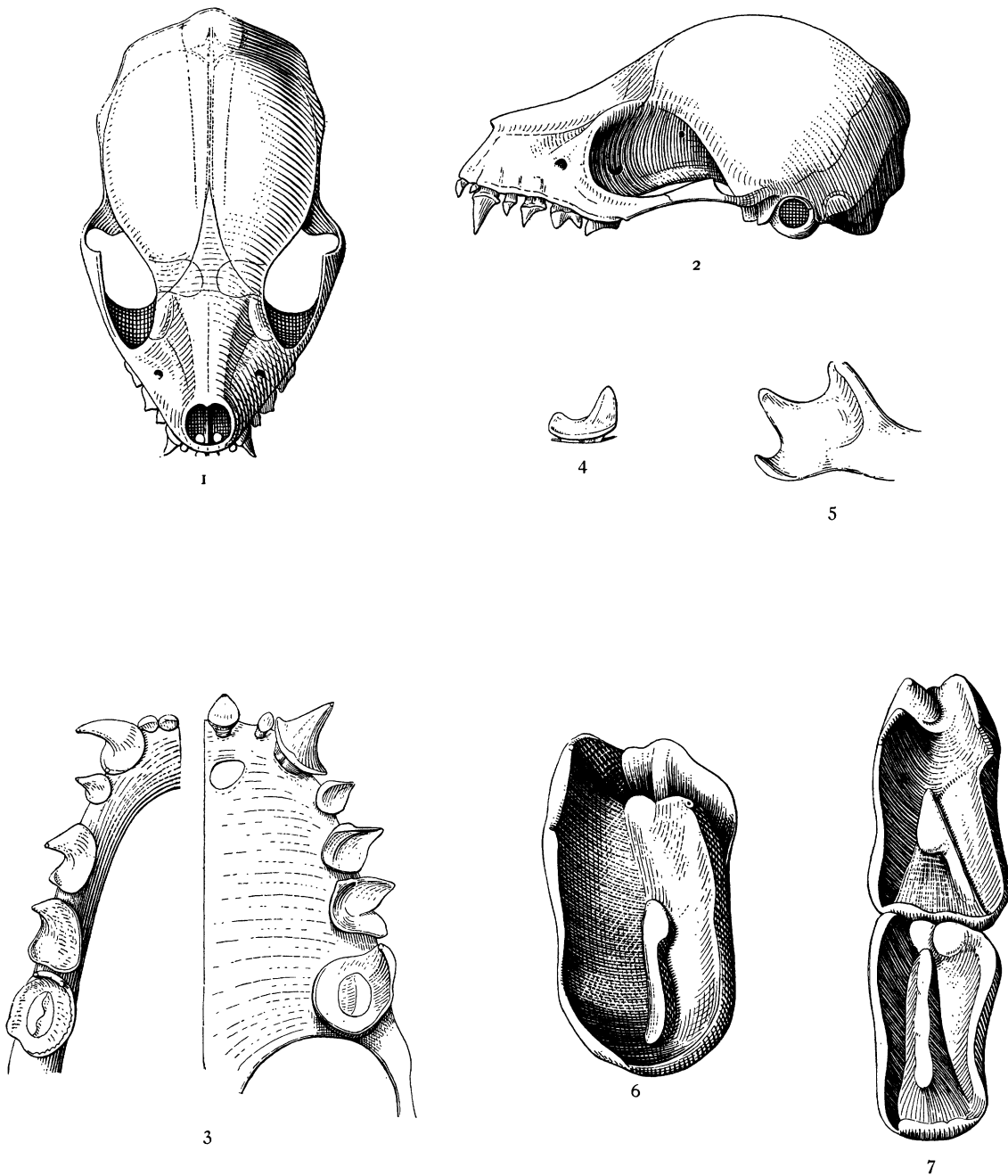
	Type, No. 15950 U. S. N. M.	Mr. O. Thomas' Specimen.
Head and body (from crown of head to base of tail).....	36	36
Length of arm.....	17	
Length of forearm.....	25	26
First digit :		
Length of first metacarpal bone.....	3	3
Length of first phalanx.....	3	3
Second digit :		
Length of second metacarpal bone.....	21	20
Length of first phalanx.....		3
Third digit :		
Length of third metacarpal bone.....	25	25
Length of first phalanx.....	9	8
Length of second phalanx.....	12	13
Length of third phalanx.....	6	6
Fourth digit :		
Length of fourth metacarpal bone.....	25	25
Length of first phalanx.....	7½	8
Length of second phalanx.....	8	7
Fifth digit :		
Length of fifth metacarpal bone.....	25	?
Length of first phalanx.....	6	6
Length of second phalanx.....	7	7
Length of head	14	14
Height of ear.....	10	10
Height of tragus	5½	?
Length of thigh.....	8½	?
Length of tibia	10	10
Length of foot	8	8
Length of interfemoral membrane.....	4	4

In concluding the account of this interesting specimen, I will call attention to the molar teeth of *Cephalotes*, a member of the remote group of the Pteropodidæ. The two genera, however, resemble one another in being frugivorous, in retaining few or no tubercles to the molars and, probably on this account, in exhibiting elongated crests in the centre of deeply excavate crowns. A tenable hypothesis for the origin of this central cusp may be expressed as follows. The grinding away of the crowns has gone on to a degree that brings the enamel cap down near to the division in the alveolus, between the sockets for the roots of the teeth, so that this ridge acts as a point of resistance to further wear and leads to a reassertion of the principle of cuspidation at this point.

One of the most marked characteristics of the teeth of fruit-eating bats is the disposition for the loss of cusps in the molar teeth. This takes place without intermediate grades so far as is known. In two of the three subdivisions of the Phyllostomidæ it occurs as exceptions to the rule—*Hemiderma* in the Vampyri and *Phyllonycteris* in the Glossophaginæ, but is the rule rather than the exception in the Stenoderminæ. In the Pteropodidæ the tendency to the loss of cuspidation is the rule, the genus *Pteralopex* being the only exception. Such abrupt variation within the limits of small groups indicates that the tendency to external specialization has weakened the type and exposes it under the influence of environment, ordinarily acknowledged as active in modifying forms, to gross modification always on the side of deterioration.

EXPLANATION OF PLATE XVI.

- Fig. 1. *Ectophylla alba*—norma verticalis.
Fig. 2. *Ectophylla alba*—norma lateralis.
Fig. 3. *Ectophylla alba*—upper and lower teeth.
Fig. 4. *Ectophylla alba*—lower molar (profile).
Fig. 5. *Ectophylla alba*—ramus of lower jaw.
Fig. 6. *Cephalotes peroni*—first right upper molar.
Fig. 7. *Cephalotes peroni*—first and second right lower molars.



ECTOPHYLLA ALBA-CEPHALOTES PERONI.